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AIR TRAFFIC CONTROL TRAINING SERIES



EQUIPMENT

SSILS
REMOTE STATUS INDICATOR
CONTROL AND INTERLOCK

26 July 1993

FOREWORD

PURPOSE. This publication is for use in the training of USAF air traffic controllers and is not intended to replace, substitute for, or supersede official regulations, procedures, or directives.

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INTRODUCTION

This training series is designed to provide air traffic control personnel assistance in developing implementing and managing an effective air traffic controller training program.

The Solid State Instrument Landing System (SSILS) and its associated monitoring equipment is part of the USAF air traffic control system. Due purpose is to familiarize controllers with the operation and use of the remote monitor control panel and interlock systems for the SSILS.

This training series is divided into five sections:

Section I. Description and General Characteristics of the SSILS Control Indicator, C-8826/GRN-27 (V).

Section II. Description and General Characteristics of the SSILS Control Indicator, C-10307/G, GRN-29 (V).

Section III. Description and Characteristics of Interlock Control, C-10306/G.

Section IV. C-6826/GRN-27 (V) Operating Checklist.

Section V. C-10367/G, GRN-29(V) Operating Checklist.

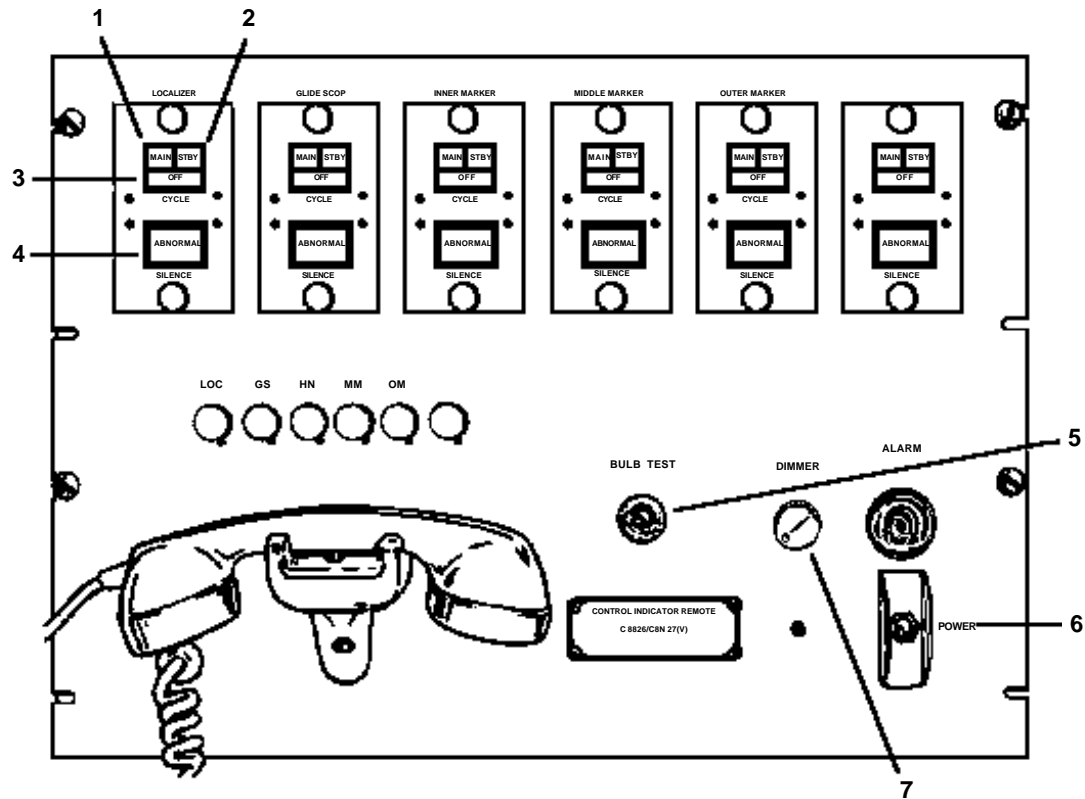


FIG 1 - 1

SECTION I

Description and General Characteristics of the SSILS Control Indicator C-6826/GRN-27 (V)

The GRN-21 remote control indicator (Fig 1-1) permits air traffic control personnel to monitor and determine the operating status of the AN/GRN-27 SSILS. The remote control indicator provides the status of the primary functional groups of the localizer, glideslope and up to three marker beacon stations. It also provides voice communications and localizer identification with various components of the SSILS via a telephone handset. To initiate a call, lift the handset from its cradle and press the desired station select switch. To reset the intercom, put the handset back in the cradle. An incoming call is signaled by a tone over the speaker. To receive a calls lift the handset from its cradle and answer the call. The ILS station calling is indicated by the lighted station select switch. The transmitter status is automatically displayed by the status lamps contained in the cycle buttons which are three color, three window, push button lighted switches (Fig 1-2). Pressing the cycle buttons causes the on site control circuitry to advance one step in the following sequence: Main, off, standby, off, main, etc. (to change fKom one sequence to the next e. g. main to off, the cycle button must first be depressed for approximately 8 seconds, 25 seconds must elapse before initiating the next cycle action). An aural alarm and abnormal light always accompany a status change. The alarm may be silenced by pressing the abnormal silence button.

1. Operating Status

| <u>Controls/Indicator Function</u> | <u>Function</u> |
|------------------------------------|---|
| MAIN "ON" (Green) | When lit (1, Fig 1-1) it indicates the main transmitter is on and the facility is usable. |
| Standby (STBY) "ON" (Amber) | When lit (2, Fig 1-1) it indicates standby transmitter is on and the facility is usable. |
| "OFF" (Red) | When lit (3, Fig 1-1) it indicates the facility has shut down and is unusable. |

2. Maintenance Status

The maintenance status of the ILS system is indicated by the abnormal button which will illuminate in "yellow". It will be accompanied by a warning buzzer.

| <u>Controls/Indicator Function</u> | <u>Function</u> |
|------------------------------------|---|
| "Flashing Abnormal" (Yellow) | The Flashing abnormal indication (4, Fig 1-1) is only activated when maintenance is at the site and have the facility in local monitor/control. The component is considered unusable unless prior coordination has been effected with maintenance to locally monitor at the site. |

"Steady" Abnormal
(Yellow)

The "Steady" abnormal (4, Fig 1-1) indication notifies personnel that maintenance is required. System usability is still determined by the status cycle light (main/standby).

3. Aural Warning Buzzer

- a. The aural warning buzzer will activate whenever:

| <u>Controls/Indicator Function</u> | <u>Function</u> |
|------------------------------------|---|
| (1) "OFF" | The "OFF" or red portion of any cycle button illuminates. |
| (2) "Abnormal" | Any "Abnormal" or yellow silence button illuminates. |
| (3) Intercom Control | Any telephone station light illuminates. |

- b. Silencing the warning buzzer can be accomplished in two ways:

(1) If the "Abnormal" (yellow) light is illuminated, depress the abnormal button.

(2) If any of the telephone station lights are illuminated, depress the station light and pick up the telephone handset.

4. Bulb Test - When pressed, lights all lamps (5, Fig 1-1).

5. Power - Turns control panel on/off (6, Fig 1-1).

6. Dimmer - Control light intensity for the MAIN "ON" lamp only (7, Fig 1-1).

7. Operation of Control Indicator:

a. If the warning buzzer is activated and the (Yellow) "Abnormal" light (4, Fig 1-2) illuminates, silence the warning buzzer by pressing the illuminated (Yellow) "Abnormal" button(s).

b. If the (Green) "Main" (1, Fig 1-2) window of the cycle button(s) goes out and comes back on or remains on after receiving an "Abnormal" light, leave the unit in operation and notify job/maintenance control.

c. If the (Amber) "STBY" (2, Fig 1-2) window of the cycle button(s) is illuminated after receiving an "Abnormal" light, leave the unit in operation and notify job/maintenance control.

(1) If the (Red) "OFF" (3, Fig 1-2) window of the cycle button illuminates wait 30 seconds for the unit to transfer itself to (Amber) STBY (2, Fig 1-2). If this occurs, notify job/maintenance control of the amber status.

(2) If the unit remains (Red) "OFF" (3, Fig 1-2) notify job/maintenance control that you have an unusable facility and take appropriate NOTAM action.

d. If the (Red) “OFF” (3, Fig 1-2) window of the cycle button illuminates after receiving an “Abnormal” (4, Fig 1-2) light and after waiting 30 seconds, does not transfer itself to “STBY” (2, Fig 1-2) depress the cycle button. If the unit returns to “Main” or “STBY” notify job/maintenance control of action taken. If the unit remains (Red) “OFF” or cycles immediately back to (Red) “OFF” take NOTAM action.

e. If none of the three windows (OFF, MAIN, STBY) of the cycle button are illuminated, perform bulb test, if all lamps are good, attempt to recycle by depressing the cycle button, waiting 30 seconds, and depressing it again. Check the transmitted identification code. This is the actual radiated ID code, which is received and sent to the remote monitor. Then, if:

(1) Either “Main” or “STBY” window illuminates, notify job/maintenance control that the ILS control indicator is defective and of any defective bulbs noted during the test.

(2) Neither “Main” or “STBY” window illuminates, take NOTAM action, notify job/maintenance control of the NOTAM action and of any defective bulbs noted during the test.

8. Test and Shutdown Procedures:

a. Test: If the warning buzzer activates and none of the cycle, abnormal, or telephone station buttons (5, Figure 1-1) illuminate, press the bulb test button to identify the burned out bulb. Notify job/maintenance control of discrepancies. The bulb test button can be used at any time to determine the status of all bulbs except telephone station lights. To test these lights, depress to test.

b. Shutdown. If shutdown of the specific site is desired, simply depress the appropriate cycle button and verify that the (Red) “OFF” window illuminates.

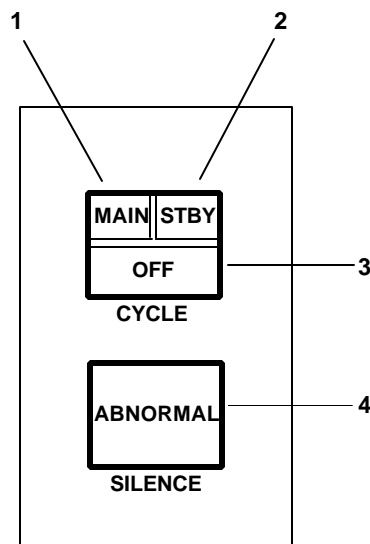


FIG 1-2

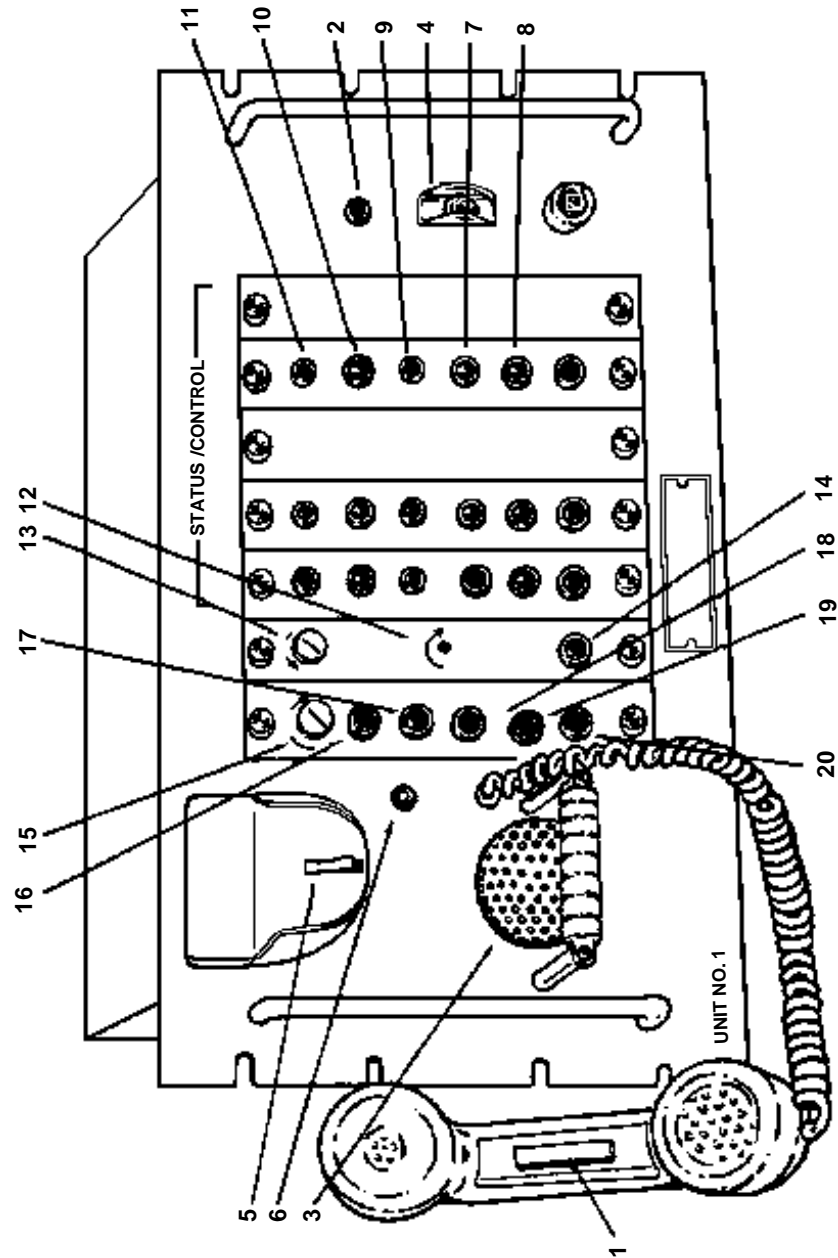


FIG 2-1

SECTION II

Description and General Characteristics of the 88ILS Control Indicator. C-10307, GRN-29 (V)

The GRN-29 remote control/display unit (RC/DU) (Fig 2-1) permits air traffic control personnel to monitor and determine the operating status of the AN/GRN-29 (V) SSILS. The RC/DU provides the status of the Primary functional groups of the localizer, glideslope and up to three marker beacon stations. It also provides voice communication and localizer identification with the various components of the SSILS via a telephone handset. To initiate a call lift the handset from its cradle and press the intercom assembly switch corresponding to the equipment site to be called. To reset the intercom, put the handset back in the cradle. An incoming call is signaled by a tone over the speaker. To receive a call, lift the handset and press the push -to- talk switch to transmit release the switch to receive.

The transmitter status is automatically displayed by the lamp of the corresponding decoder/control assembly. Pressing the station cycle (STA CYCLE) switch causes the on site control circuitry to advance one step in the following sequence mains off, standby off, main, etc. The alarm may be silenced by pressing the alarm silence switch.

1. Operations of Control Indicator

| <u>Controls/Indicator</u> | <u>Function</u> |
|-----------------------------|---|
| Handset push-to-talk switch | Enables amplifier for intercom talk function. (1, Fig 2-1) |
| Power lamp | Power on lamp. (2, Fig 2-1) |
| Speaker | Aural alarm Speaker. (3, Fig 2-1) |
| Power (ON/OFF) | Power supply on/off switch. (4, Fig 2-1) |
| Handset on hook switch | Rearms call detecting circuits upon completion of call. (5, Fig 2-1) |
| Bulb test switch | Spring-loaded toggle switch, when pressed, lights all lamps. (6, Fig 2-1) |

2. Decoder/Control Assembly

| <u>Controls/Indicator</u> | <u>Function</u> |
|---------------------------|--|
| EXEC BYP lamp | Amber; lights to indicate equipment site action has bypassed remote control function. (7, Fig 2-1) |

| | |
|-----------|---|
| ABNL lamp | Amber; lights to indicate abnormal status, flashes to indicate Loss of monitor tone output (monitor bypassed). (8, Fig 2-1) |
| OFF lamp | Red; lights to indicate equipment site transmitter are shut off. (9, Fig 2-1) |
| STBY lamp | Amber; lights to indicate standby transmitter group in operation. (10, Fig 2-1) |
| Main lamp | Green; lights to indicate main transmitter group in operation. (11, Fig 1-2) |

3. Audio Generator Assembly

Controls/Indicator

Function

| | |
|----------------------|--|
| Alarm volume control | Screwdriver adjustment controls volume of incoming status alarm and intercom ring signals. (12, Fig 2-1) |
| Dimmer control | Controls brightness of decoder/control assembly MAIN lamp. (13, Fig 2-1) |
| Alarm SILENCE switch | Silences alarm indication from loudspeaker. (14, Fig 2-1) |

4. Intercom Assembly

Controls/Indicator

Function

| | |
|-------------------|--|
| Phone Vol Control | Adjusts telephone handset volume level. (15, Fig 2-1) |
| Loc Switch | Localizes site intercom call switch. (16, Fig 2-1) |
| GS Switch | Glideslope site intercom call switch. (17, Fig 2-1) |
| Inner MKR Switch | Inner marker site intercom call switch. (18, Fig 2-1) |
| Middle MKR Switch | Middle marker site intercom call switch. (19, Fig 2-1) |
| Outer MKR Switch | Outer marker site intercom call switch. (20, Fig 2-1) |

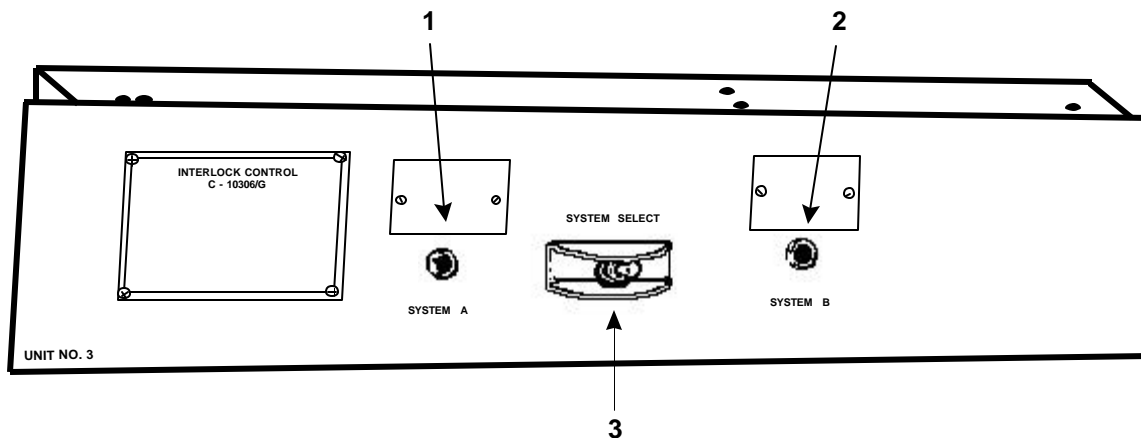


FIG 3-1

SECTION III

Description and Characteristics of Interlock Control, C-10306/G

Interlock Control C-10306/G (ICU) is required at each facility having an AN/GRN-27 or another AN/GRN-29 ILS facing an AN/GRN-29 ILS on the same runway. Installed in the primary monitor facility and collocated with the RC/DU, the ICU permits air traffic control personnel to select one, and only one, of the two facing ILS equipments for effective radiation at a given time.

Operations of the Interlock Control Unit

Controls

Function

System A lamp

Green; lights to indicate system A ILS is selected. (1, Fig 3-1)

System B lamp

Green; lights to indicate system B ILS is selected. (2, Fig 3-1)

System Select (A/B) Switch

Toggle switch; select either A or B ILS for operation. (3, Fig 3-1)

Special Procedures for Dual ILS

(GRN-27 with GRN-29) Locations:

1. Dual ILS locations with an interlocked GRN-21 and GRN-29 require special procedures to prevent the GRN-27 from going into alarm when changing active systems. If the GRN-27 is active and the interlock control unit switched to make the GRN-29 active GRN-27 will go into alarm and shutdown. The entire GRN-27 must then be reset, by maintenance personnel at the glideslope and localizer sites. To avoid this situation, use the following procedures.

a. To switch from an active GRN-21 to an active GRN-29:

Step 1: Cycle the GRN-21 localizer and glideslope "off" using the GRN-27 control/monitor unit.

Step 2: Select the GRN-29 system using the Interlock Control Unit.

b. To switch from an active GRN-29 to an active GRN-27.

Step 1: Select the GRN-27 system using the Interlock Control Unit.

Step 2: Cycle the GRN-27 glideslope and localizer using the GRN-27 control/monitor unit. (Note, if the GRN-21 previously was using the "main-transmitters the standby transmitters will come on, so it will be necessary to further cycle the units to bring the main transmitters "on").

***NOTE:** Units with dual GRN-27 should take the same action on both system.

SECTION IV

C-8826/GRN-27 (V) Operating Checklist

| <u>Indication</u> | <u>Facility Status</u> | <u>Controller</u> |
|---|--|--|
| "MAIN" ON illuminated (Green) | Systems operating normal, usable facility. | None. |
| "STBY" ON illuminated (Amber) | Standby transmitter in operation, usable facility. | Notify job/maintenance control. |
| "OFF" illuminated (Red) | Facility has shut down and is unusable. | Depress cycle button for approximately 8 seconds. Wait 30 seconds, if unit returns to MAIN-STBY, notify job/maintenance control of action taken. |
| Flashing "ABNORMAL" with warning buzzer (Yellow) | Facility unusable maintenance in progress. | Contact the facility, if no answer, take NOTAM action. Communications must be established and prior coordination must have been effected with maintenance to locally monitor at the site if NOTAM action is not taken. Depress abnormal button to stop buzzer. |
| Steady "ABNORMAL" warning buzzer and any condition (Yellow) | Maintenance required, usable facility. | Notify job/maintenance control. Depress abnormal button to stop buzzer. |
| "MAIN" cycles OFF, then ON, remains ON, (Green) | Usable facility. | Notify job/maintenance control of momentary alarm. |
| "OFF" illuminates (Red) | Facility has shut down and is unusable. | Wait 30 seconds for the system to transfer itself to "STBY". |

| | | |
|---|--|--|
| "OFF" remains on 30 seconds (Red) | Facility has shut down and is unusable. | Depress cycle button for approximately 8 seconds. Wait 30 seconds if unit returns to MAIN-STBY, notify job/maintenance control of action taken. |
| If unit remains (Red) | Facility has shut down and is unusable. | After waiting 30 seconds and, if the red "OFF" light stays on or cycles back to reference OFF, NOTAM the unit, notify job/maintenance control. |
| "OFF" "MAIN" "STBY" (Red) (Green) (Amber) windows ALL extinguished | Facility is unusable. | Perform bulb test then listen for localizer ID. Depress the cycle button for approximately 8 sec- onds. Wait 30 seconds, and depress the cycle button again. |
| "MAIN" or "STBY" (Green) (Amber) window illuminates | Facility usable, maintenance required. | Perform the bulb test, notify job/maintenance control the ILS con- trol indicator unit is defective and of any defective bulbs. |
| "MAIN" and "STBY" (Green) (Amber) windows regain extinguished | Facility is unusable. | Take NOTAM action, perform the bulb test, notify job/maintenance control of the NOTAM and of any defective bulbs. |

SECTION V

C-10307/G, GRN-29 (V) Operating Checklist

| <u>Indication</u> | <u>Facility Status</u> | <u>Controller Actions</u> |
|--------------------------------------|--|--|
| "MAIN" ON illuminated (Green) | System operating normal, usable facility. | None. |
| "STBY" ON illuminated (Amber) | Standby transmitted group in operations, usable Facility. | Notify job/maintenance control. |
| "ABNL" ON illuminated (Amber) | Maintenance required, usable facility. | Notify job/maintenance control. |
| "EXEC BYP" ON illuminated (Amber) | Maintenance has taken action to bypass remote control function, usable facility. | Notify job/maintenance control. Controller does not have cycle capability. |
| "OFF" (Red) | Facility has shut down and is unusable. | Notify job/maintenance control immediately and cycle the standby transmitter. If standby does not cycle, NOTAM the facility. |
| Flashing ABWL lamp (Amber) | Facility unusable, maintenance in progress. | Contact the facility, if no answer, take NOTAM action. Communications must be established and prior Coordination must have been effected with maintenance to locally monitor at the site, if NOTAM action is not taken. Depress the silent button to stop buzzer. |
| Aural Alarm | Abnormal site status or incoming intercom call. | Silence alarm, notify job/maintenance control or receive incoming call. |